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(54) Abstract Title
Displaying television programme progress time in a digital television receiver

(57) A method for displaying programme progress time in a television receiver which receives and processes programme guide information containing a programme schedule, comprises the steps of storing the programme guide information, and displaying time information about the relevant programme on the television display when the user issues a command requesting the display of the programme progress time with respect to the currently viewed programme. Next programme information may be displayed when the remaining programme time reaches a preset time.

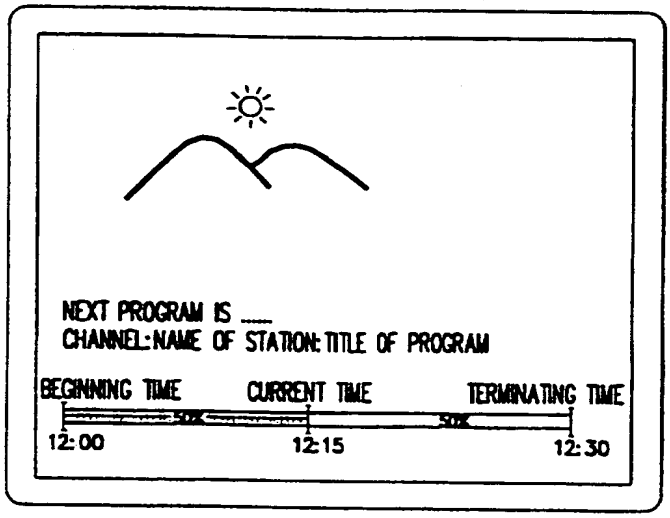

FIG. 5

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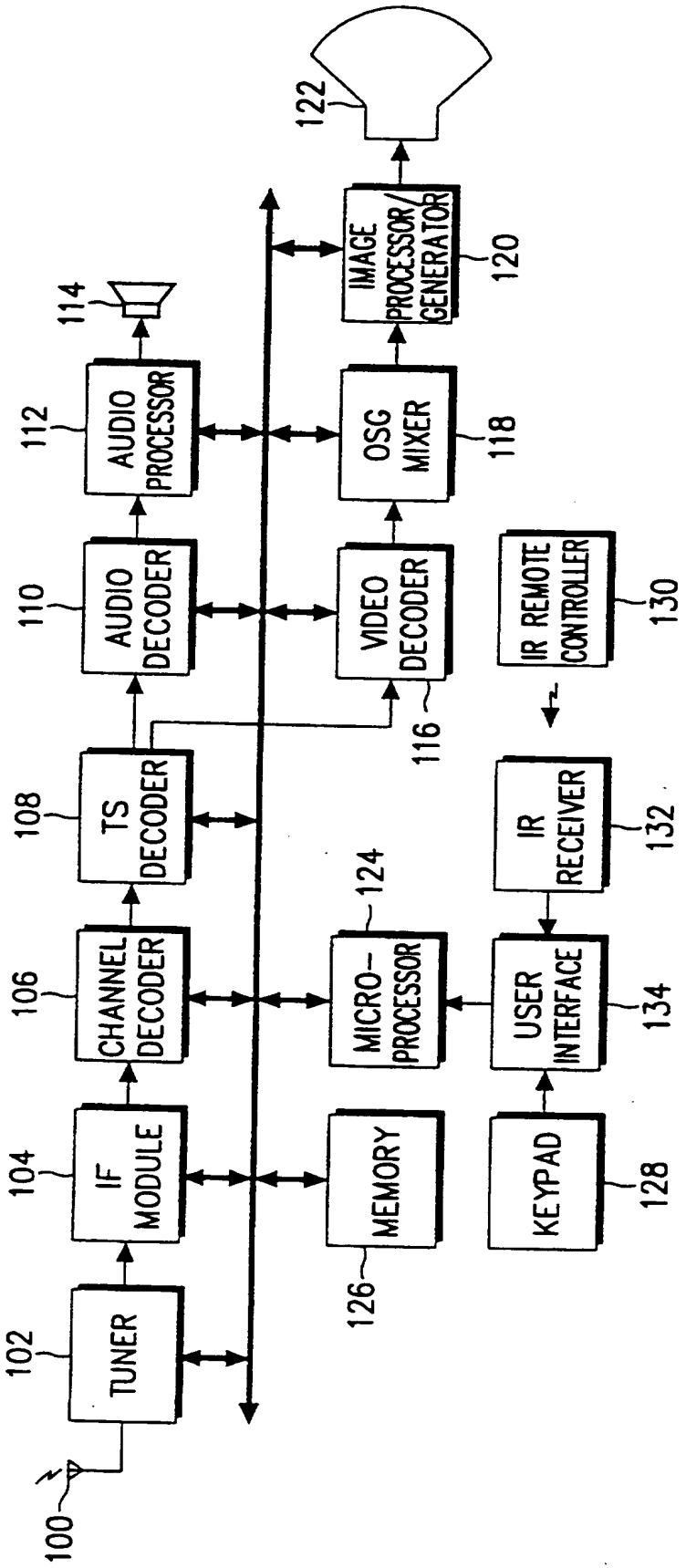

FIG. 1

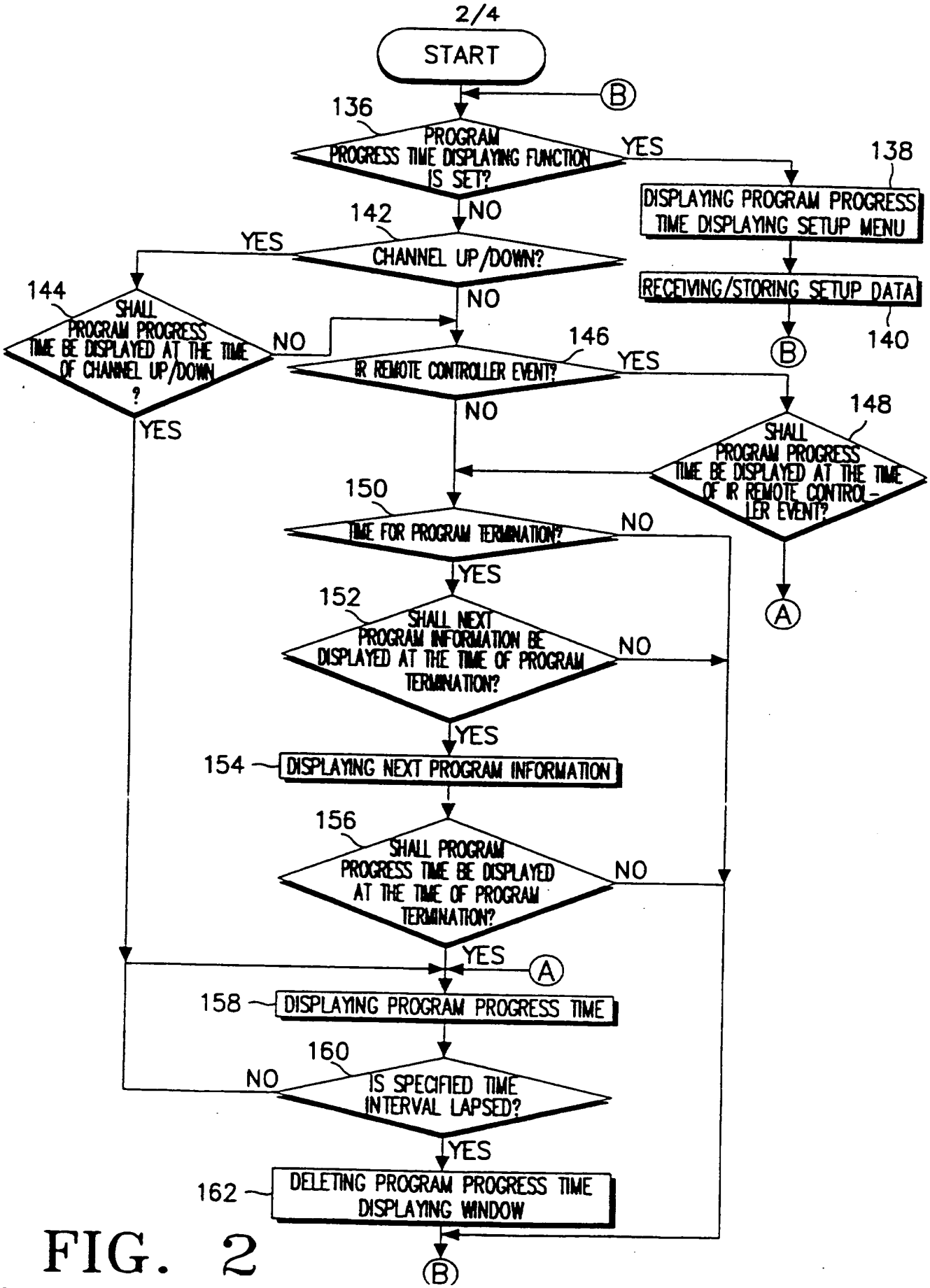

FIG. 2

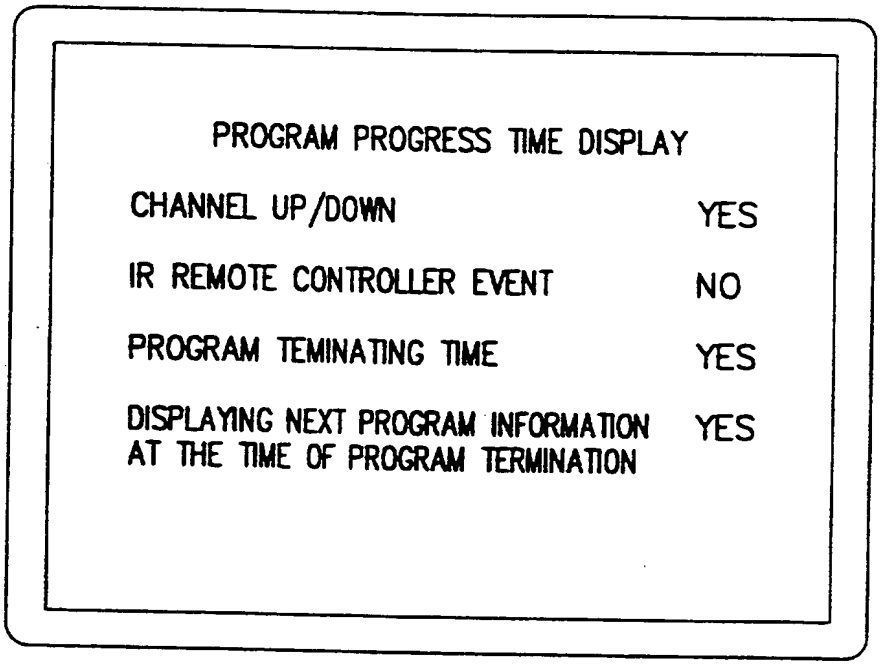

FIG. 3

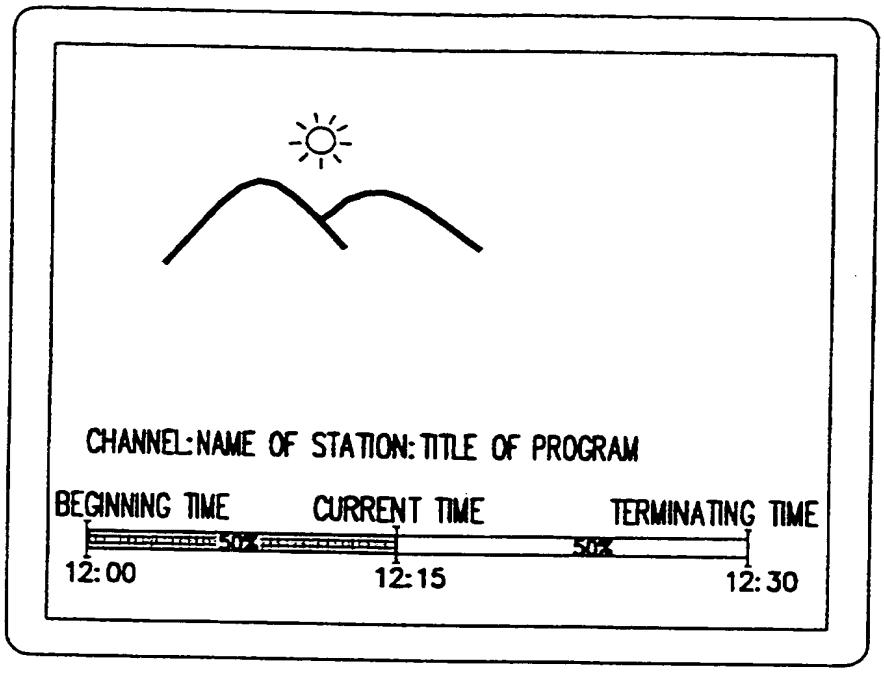

FIG. 4

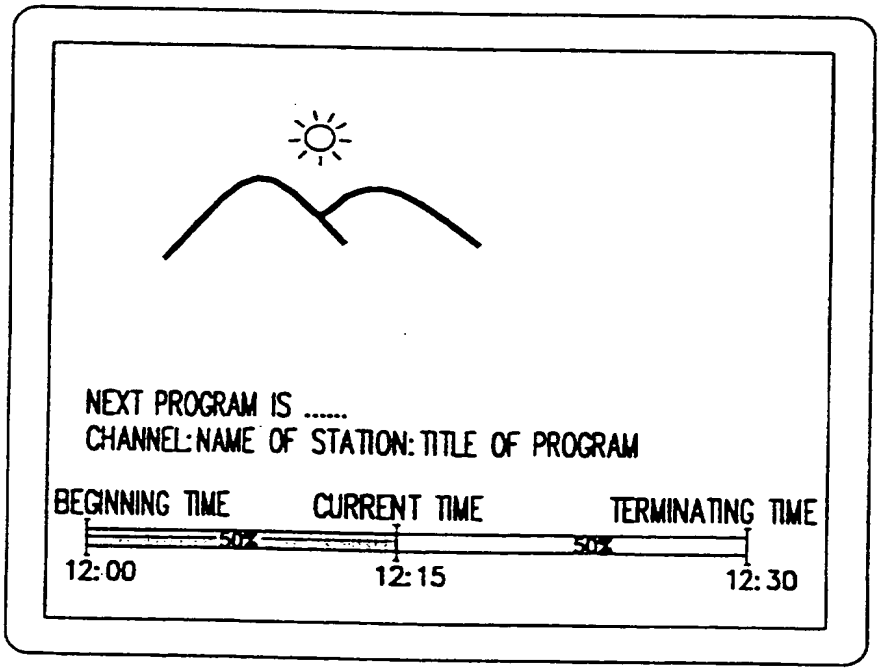

FIG. 5

METHOD FOR DISPLAYING TV PROGRAMME PROGRESS TIME AND DEVICE THEREOF

The present invention relates to a TV receiver, and particularly to a method for displaying TV programme progress time and a device thereof.

Usually, a user can check the TV programme progress time, i.e., beginning/terminating time, and televised time elapsed, by referring to the programme schedule guide information printed on information media like news papers and magazines.

Besides, in the next generation digital TV broadcasting system capable of providing users with programme guide information, users can instruct a TV set to display the programme schedule information according to the programme guide in order to check the progress time of the currently viewed programme.

When the TV receiver displays the programme schedule information in response to the above instruction, the user can check the progress time of the currently viewed programme from the programme schedule information.

As mentioned above, it is cumbersome for the user to refer to news papers in order to check the progress time of the currently viewed programme in the conventional method.

In the device for displaying programme schedule information as in the next generation digital TV receiver, it is also inconvenient for the user to instruct the TV set during viewed to display programme schedule information. Furthermore, such display of the programme

schedule information overlaps with the programme screen, which is another problem causing interruption of user's viewed. It is also troublesome for the user to search the programme schedule information for the currently viewed programme in order to check the programme progress time.

Accordingly, it is an aim of embodiments of the present invention to provide a method and device capable of directly displaying the programme progress time information about the currently viewed programme on the screen immediately when requested.

According to an aspect of the present invention, a method is provided for displaying programme progress time in a TV receiver which receives and processes programme guide information containing a programme schedule, comprises the steps of storing said programme guide information, and displaying time information about the relevant programme on a television display picture tube when the user issues a command requesting the display of programme progress time with respect to the currently viewed programme.

Preferably, said time information is displayed together with a video signal on said television display.

Said time information may be the time of programme termination.

Said time information may comprise the beginning time and the current time with respect to said currently viewed programme.

Said time information may comprise the programme progress time calculated by subtracting a beginning time of said programme from a current time.

Said time information may comprise a remaining programme time calculated by subtracting a current time from a terminating time of the currently viewed programme.

Said method preferably further comprises the step of displaying next programme information when said remaining programme time reaches a preset time.

Preferably said time information is represented as a percentage of said programme progress time as compared with a total programme broadcasting time calculated by subtracting a said beginning time from terminating time of said currently viewed programme.

Said time information may further comprise a percentage of said remaining programme time as compared with said total programme broadcasting time.

Said command requesting the display of said programme progress information may be initiated by means of an ordinary television-related commands of the TV receiver according to said user's setup.

A channel up/down command of said TV receiver preferably initiates said command requesting the display of said programme progress information.

A remote controller event may initiate said command requesting the display of said programme progress information.

Said method may further comprise the step of judging that said command for displaying said programme progress time is issued by said user when a programme terminating time corresponds to a preset time set by said user.

According to a second aspect of the invention, there is provided a method for displaying programme progress time in a TV receiver which receives and processes programme guide information containing a programme schedule, the method comprising the steps of: receiving and storing said programme guide information; calculating a total programme broadcasting time by subtracting a current time from a programme terminating time of the programme currently being viewed when a user issues a command requesting the display of said programme progress time of said currently viewed programme; calculating said programme progress time by subtracting a programme beginning time from said current time; displaying a graphical representation of said total programme broadcasting time; and indicating on said graphical representation a position corresponding to said programme progress time.

Said graphical representation may comprise a display bar.

Said method preferably further comprises the step of displaying said bar by distinguishing between a portion of said programme progress time which has elapsed and a portion of said programme progress time remaining.

Said method may further comprise the step of displaying said programme progress time calculated by subtracting said programme beginning time from said current time on a portion of said bar between the starting

position and the position corresponding to said programme progress time elapsed.

Said remaining programme progress time may be calculated by subtracting said current time from said programme terminating time and displayed on another portion of said bar between the position corresponding to said programme progress time elapsed and the end position of said bar.

According to a third aspect of the invention, there is provided a device for displaying programme progress time, comprising: a receiving unit for receiving a TV programme guide containing the programme schedule and for receiving the TV programme; a user interface enabling the entry of user's command requesting for the display of the programme progress time; an audio output unit for generating audio signal of said programme; a video output unit for mixing video data and On-Screen-Graphic data of said TV programme so as to further output the resulting signal; and a microprocessor for producing said On-Screen-Graphic data for displaying said programme progress time in response to said user's command so as to further deliver to said video output unit.

The device of the third aspect may further comprise any one or more features of the accompanying claims, description, abstract or drawings, in any combination.

For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

Figure 1 is a block diagram illustrating an HDTV receiver to which the present invention is applicable;

Figure 2 is a flow chart illustrating the display of programme progress time according to the preferred embodiment of the present invention;

Figure 3 is a descriptive diagram of the display screen illustrating the setup menu of the programme progress time information according to the preferred embodiment of the present invention; and

Figures 4 and 5 are descriptive diagrams illustrating the programme progress time information displayed on the screen of a television display according to the preferred embodiment of the present invention.

In order that the present invention is implemented, the broadcast station broadcasts programme schedule information, whereby the above TV set receives and stores the above programme schedule information, and thereby displays the programme progress time on a TV screen according to the embodiment of the present invention.

As mentioned above, TV broadcast stations broadcast most broadcast programme schedule information. Besides, next generation digital TV broadcasting systems like HDTV (high definition television) provides users with programme information. Particularly, the United States Advanced Television System Committee (ATSC) standard stipulates that programme schedule information shall be included in the electronic programme guide (EPG).

When the present invention is applied to such next generation digital TV broadcasting systems, the broadcast

station doesn't need to separately broadcast programme schedule information.

An example of the application of the present invention to the above HDTV is explained in the following. Referring to Figure 1, the tuner 102 selects an RF channel desired by a user from the input signals received through antenna 100 under the control of microprocessor 124, thereby outputting an IF (intermediate frequency) signal, which is converted into a baseband signal by IF module 104 to be further delivered to a channel decoder 106. The channel decoder 106 decodes the baseband signal to a channel signal to reconstruct the transport stream (TS). The TS decoder 108 separates the above reconstructed TS into audio and video streams and auxiliary data.

The above audio stream is applied to an audio decoder 110, whereby audio data are reconstructed and further processed to be converted into an audio signal by audio processor 112, thereupon being output through a speaker 114.

The above video stream is applied to a video decoder 116, whereby video data are reconstructed and thereupon applied to an OSG (on screen graphic) mixer 118 so as to be mixed with OSG data under the control of microprocessor 124 and further delivered to a video processor 120 by which the video data are converted into video signals to be applied to a television display or picture tube 122.

The above microprocessor 124 performs operations commanded by user instructions input from keypad 128 or IR remote controller 130 through user interface 134 in accordance with the programme stored in memory 126. The user instructions input from IR remote controller 130 are

delivered in the form of an IR signal to IR receiver 132 so as to be further applied to user interface 134. Further, the microprocessor 124 receives auxiliary data containing EPG information from TS decoder 108.

The memory 126 consists of a ROM (Read Only Memory) for storing the programme of microprocessor 124, a RAM (Random Access Memory) for temporarily storing data resulting from programme execution of microprocessor 124, and a EEPROM (Electrically Erasable and Programmable ROM) for storing various reference data.

Referring to Figure 2, the preferred embodiment of the present invention is described in detail in the following. In step 136, the microprocessor 124 checks whether a user instruction for the setup of a programme progress time displaying function is received from keypad 128 or IR remote controller 130. When the user sets the programme progress time displaying function, the microprocessor 124 proceeds to step 138, and otherwise proceeds to step 142. In step 138, the microprocessor 124 generates OSG data for displaying the setup menu of programme progress time displaying function to deliver such OSG data to OSG mixer 118. The OSG mixer 118 mixes the above OSG data from microprocessor 124 and the video data from video decoder 116, thereby delivering the resulting data to image processor/generator 120 to display the setup menu of programme progress displaying function on the television display screen.

Referring to Figure 3 illustrating the setup menu of a programme progress time displaying window, the menu is presented on the left side of the window, and the selection state on the right side.

That is, the menu offers menu selection options for displaying programme information comprising "when changing channel up/down", "in IR remote controller events", "when terminating programmes", and "next programme information when terminating programmes".

The user's selection state is manipulated by selecting "YES" or "NO" by means of keypad 128 and IR remote controller 130, whereby the user selects "YES" for displaying the programme progress time with respect to respective menu options, and otherwise selects "NO".

Besides, the user selects "YES" for displaying next programme information when terminating a current programme, and otherwise selects "NO".

In step 140, the microprocessor 124 receives and stores setup data for displaying programme progress time information, thereupon returning to step 136.

In step 142, the microprocessor 124 checks whether the user issues the channel up/down command by means of keypad 128 and IR remote controller 130, thereby performing the step 144 when the channel up/down command is issued, and otherwise the step 146.

In step 144, the microprocessor 124 reads out the above setup data, thereby checking whether the setup menu is set so as to display programme progress time when the channel is changed up and down, whereupon the microprocessor 124 proceeds to step 158 if the setup menu is set so as to display programme progress time when the channel is changed up and down, thereby displaying programme progress time.

The above microprocessor 124 produces OSG data for displaying programme progress time to further deliver to OSG mixer 118, whereupon the OSG mixer 118 mixes the above OSG data from microprocessor 124 and the video data from video decoder 116 and delivers the resulting data to image processor/generator 120 so as to further output it to display 122.

Referring to Figure 4 illustrating the programme progress time display based on the data produced by mixing video data and OSG data by means of OSG mixer 118, the On-Screen-Graphic is described in detail as follows. First, the microprocessor 124 reads out the relevant programme schedule information from the programme guide and then checks the beginning/terminating time of the programme, thereby displaying the beginning and terminating time, and the current programme progress time showing the time elapsed.

Referring to Figure 4, a bar is displayed, wherein one end of the bar represents the beginning time and the other end thereof represents the terminating time, and the entire length thereof represents the entire broadcasting time of the programme.

When the programme progress time is displayed, the current time is detected and indicated on the bar, whereby the portion from the beginning time to the current time is called the progress time portion which is displayed in different color with respect to the other portion.

The progress time portion is indicated percentage wise with respect to the entire length of bar, i.e., the entire broadcasting time. And the other portion from the current time to the terminating time is called the

remaining time portion which is indicated percentage wise with respect to the entire bar length.

Furthermore, the programme number, the name of broadcast station, and the title of programme are displayed above the time bar, the entirety of this data is called the "programme progress time information".

After displaying the programme progress time information, the microprocessor 124 performs the steps of 160-162, thereby closing the display window of the programme progress time information after a specified time interval has elapsed, and returns to step 136.

In step 144, if the setup menu is set so as not to display the programme progress time when the channel is changed up or down, then the microprocessor 124 proceeds to step 146.

In step 146, the microprocessor 124 checks whether an IR remote controller event has occurred (i.e. whether the IR remote controller 130 has been activated) and if so proceeds to step 148, and if otherwise to step 150. In step 148, the microprocessor 124 checks the above setup data for whether the programme progress time shall be displayed when an IR remote controller event occurs, and if so performs the steps of 158-162, and otherwise proceeds to step 150.

In step 150, the microprocessor 124 checks whether the current time is for programme termination. The time for programme termination is a preset time set to the time before the programme termination. Such preset time is set at the time of manufacture, or can be set by user. Thus, when the current time is for programme termination, the

microprocessor 124 proceeds to step 152, and otherwise returns to step 136.

In step 152, the microprocessor 124 checks the above setup data for whether the next programme information shall be displayed when the current programme is terminated, and if so, proceeds to step 154, and otherwise returns to step 136.

In above step 154, the microprocessor 124 produces OSG data for displaying next programme information to further deliver to OSG mixer 118, whereupon the OSG mixer 118 mixes the above OSG data from microprocessor 124 and the video data from video decoder 116 and delivers the resulting data to image processor/generator 120 which generates screen output for the display 122.

Upon generation of OSG data for displaying next programme information, the microprocessor 124 proceeds to step 156 to check whether the setup menu is set so as to display programme progress time when the current programme is terminated, and if so, performs steps 158-162, and otherwise returns to step 136.

When the setup menu is set to display the next programme information and the programme progress information, the microprocessor 124 displays all such information as shown in Figure 5. The OSG for next programme information is displayed above the programme progress time bar.

As described above, the programme progress time is displayed when the channel is changed up and down, or at the remote controller event, or at the preset time of programme termination according to user's selection, and

the next programme information is displayed when the programme is terminated.

As described above, the present invention has the advantage that programme progress time can be displayed on the television display without necessitating the separate manipulation of operations required for the checking of programme progression.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any

accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. A method for displaying programme progress time in a TV receiver which receives and processes programme guide information containing a programme schedule, comprising the steps of:

storing said programme guide information; and

displaying time information about the relevant programme on a television display when the user issues a command requesting the displaying of programme progress time with respect to the currently viewed programme.

2. A method for displaying programme progress time as defined in claim 1, wherein said time information is displayed together with a video signal on said television display.

3. A method for displaying programme progress time as defined in claim 1 or 2, wherein said time information is the time of programme termination.

4. A method for displaying programme progress time as defined in claim 1, 2 or 3, wherein said time information comprises the beginning time and the current time with respect to said currently viewed programme.

5. A method for displaying programme progress time as defined in any of the preceding claims, wherein said time information is the programme progress time calculated by subtracting a beginning time of said programme from a current time.

6. A method for displaying programme progress time as defined in any of the preceding claims, wherein said time

information comprises a remaining programme time calculated by subtracting a current time from a terminating time of the currently viewed programme.

7. A method for displaying programme progress time as defined in claim 6, wherein said method further comprises the step of displaying next programme information when said remaining programme time reaches a preset time.

8. A method for displaying programme progress time as defined in any of the preceding claims, wherein said time information is represented as a percentage of said programme progress time as compared with a total programme broadcasting time calculated by subtracting a said beginning time from a terminating time of said currently viewed programme.

9. A method for displaying programme progress time as defined in claim 8 as dependent upon claim 6, wherein said time information further comprises a percentage of said remaining programme time as compared with said total programme broadcasting time.

10. A method for displaying programme progress time as defined in any of the preceding claims, wherein said command requesting the display of said programme progress information is initiated by means of an ordinary television-related command of the TV receiver according to said user's setup.

11. A method for displaying programme progress time as defined in claim 10, wherein a channel up/down command of said TV receiver initiates said command requesting the display of said programme progress information.

12. A method for displaying programme progress time as defined in claim 10 or 11, wherein a remote controller event initiates said command requesting the display of said programme progress information.

13. A method for displaying programme progress time as defined in any of the preceding claims, wherein said method further comprises the step of judging that said command for displaying said programme progress time is issued by said user when a programme terminating time corresponds to a preset time set by said user.

14. A method for displaying programme progress time in a TV receiver which receives and processes programme guide information containing a programme schedule, the method comprising the steps of:

receiving and storing said programme guide information;

calculating a total programme broadcasting time by subtracting a current time from a programme terminating time of the programme currently being viewed when a user issues a command requesting the display of said programme progress time of said currently viewed programme;

calculating said programme progress time by subtracting a programme beginning time from said current time;

displaying a graphical representation of said total programme broadcasting time; and

indicating on said graphical representation a position corresponding to said programme progress time.

15. A method according to claim 14, wherein said graphical representation comprises a display bar.

16. A method as defined in claim 15, wherein said method further comprises the step of displaying said bar by distinguishing between a portion of said programme progress time which has elapsed and a portion of said programme progress time remaining.

17. A method for displaying programme progress time as defined in claim 16, wherein said method further comprises the step of displaying said programme progress time calculated by subtracting said programme beginning time from said current time on a portion of said bar between the starting position and the position corresponding to said programme progress time elapsed.

18. A method for displaying programme progress time as defined in claim 16 or 17, wherein said remaining programme progress time calculated by subtracting said current time from said programme terminating time is displayed on another portion of said bar between the position corresponding to said programme progress time elapsed and the end position of said bar.

19. A device for displaying programme progress time, comprising:

a receiving unit for receiving a TV programme guide containing the programme schedule and for receiving the TV programme;

a user interface enabling the entry of a user's command requesting the display of the programme progress time;

an audio output unit for generating an audio signal of said programme;

a video output unit for mixing video data and On-Screen-Graphic data of said TV programme so as to further output the resulting signal; and

a microprocessor for producing said On-Screen-Graphic data for displaying said programme progress time in response to said user's command so as to further deliver to said video output unit.

20. A device according to claim 19, further comprising any one or more features from the accompanying claims, description, abstract or drawings, in any combination.

21. A method for displaying programme progress time substantially as herein described with reference to the accompanying drawings.

22. A device substantially as herein described with reference to the accompanying drawings.

The Patent Office

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Application No: GB 9726436.0 **Examiner:** John Coules
Claims searched: 1-22 **Date of search:** 5 May 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): H4F FBB,FBA,FGG,FGH,FGS,FGT

Int Cl (Ed.6): H04N 7/088,5/445

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	JP 08289202 A	(Sony) see WPI Abstract Accession No 97-027846/199703	1-22
A	US 5589892	(Knee et al)	
X	Research Disclosure, May 1996, No 38507 and WPI Abstract Accession No 96-266384/199627		1-22

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.